

Code: ECMC1T5B

I M.Tech - I Semester - Regular Examinations – March 2014

**ANTENNA ARRAYS & SYNTHESIS
(MICROWAVE & COMMUNICATION ENGINEERING)**

Duration: 3 hours

Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1. a) Explain the following terms related to Antenna
 - i) Radiation pattern 2 M
 - ii) Directive gain 2 M
 - iii) Front –to- back ratio 2 M
 - iv) Antenna beam width and bandwidth 2 M

- b) Calculate the radiation resistance, antenna efficiency, directivity for an antenna carrying a current of 50Amps at 480 KHz having effective length of 60.96mts and the loss resistance of the antenna is 5Ω . 6 M

2. a) Derive the field strength for N-element uniform linear array? 7 M

- b) Obtain the power radiated by a $\lambda/10$ dipole if the current distribution is 7 M
 - i) Uniform
 - ii) Triangular with a peak current of 2Amps

3. a) Explain array pattern evaluation including mutual coupling effect? 7 M
- b) What are the different types of coupling and how impedance of the array is affected? 7 M
4. a) Explain the design considerations for circular arrays? 7 M
- b) Find the radiation efficiency for a rectangular array? 7 M
5. a) What is a discrete array and how the array factor is evaluated using fourier transform method? 7 M
- b) Explain about visible and invisible regions for $\alpha_c = 0$, $d = \lambda/8$ using schelkunoff polynomial method? 7 M
6. a) Explain about azimuthal angle coverage using planar and curved surfaces? 7 M
- b) What is conformal array and write its applications? 7 M
7. Explain about
- i) EMC patch array 5 M
 - ii) Slot-fed patch array 5 M
 - iii) finite patch array 4 M

8. a) Explain with a diagram and equations about absolute gain measurements? 7 M
- b) Explain about different antenna ranges? 7 M